



# Workshop #1

American Academy  
of Forensic Sciences



February 22, 2016

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## Information Does Exist Beyond the First Page of Your Google® Search!

Tools and Strategies  
for Forensic Science Literature  
Searching and Use

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Chair: **John M. Butler**

Co-Chair: **Matthew R. Wood**





W1: Information Does Exist Beyond the First Page of Your Google® Search!  
American Academy of Forensic Sciences  
Las Vegas, NV (February 22, 2016)



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### Tools and Strategies for Forensic Science Literature Searching and Use

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## Purpose of this Workshop

We hope that participants:

- Gain a better understanding of the current approaches and tools for discovering, using, and analyzing the forensics literature
- See worked examples using both free resources available to any practitioner and specialized literature databases available to academic researchers and students
- Come away with ideas to improve accessibility and use of forensic science literature in your work

## Workshop Faculty

**John M. Butler, PhD** [john.butler@nist.gov](mailto:john.butler@nist.gov)  
National Institute of Standards and Technology, 301-975-4049  
Special Programs Office, Gaithersburg, MD

**Jeff Teitelbaum, MLIS** [Jeff.Teitelbaum@wsp.wa.gov](mailto:Jeff.Teitelbaum@wsp.wa.gov)  
Washington State Patrol, 206-262-6027  
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Special Programs Office, Gaithersburg, MD

## Program Schedule

Time	Presenter	Topic
8:30 – 8:35 a.m.	Matthew Wood	Introduction to Workshop and Presenters
8:35 – 9:15 a.m.	John Butler	Why Search and Read the Forensic Science Literature?
9:15 – 9:45 a.m.	Jeff Teitelbaum	Free Forensic Science Information Resources for the Practitioner
9:45 – 10:15 a.m.	Susan Makar & Amanda Malanowski	Tools for Searching and Analyzing the Forensic Science Literature
<b>10:15 – 10:30 a.m.</b>		<b>BREAK</b>
10:30 – 11:10 a.m.	Jeff Teitelbaum & Susan Makar	Case Examples (latent prints, handwriting, DNA, specific authors)
11:10 – 11:40 a.m.	Melissa Taylor	ForSciPub: A Vision for the Future of Forensic Science Literature
11:40 – 11:50 a.m.	John Butler	Other Activities Regarding Forensic Literature: AAAS, NCFS, OSAC
11:50 – 12:00 p.m.	All	Discussion, Q&A

## NIST Disclaimer

**Points of view are the presenters** and do not necessarily represent the official position or policies of the National Institute of Standards and Technology.

Certain commercial equipment, instruments and materials are identified in order to specify experimental procedures as completely as possible. In no case does such identification imply a recommendation or endorsement by the National Institute of Standards and Technology nor does it imply that any of the materials, instruments or equipment identified are necessarily the best available for the purpose.

## Questions ???

- **Due to the volume of material we are trying to cover, we may not have time to stop and answer extensive questions during the presentations**
- Please write your questions down
  - **Written questions provided at the break will be addressed during the final Q&A at the end of the workshop**
- Feel free to email us with your questions
- We will try to allow a few minutes at the end of each presentation, and we will be happy to stay afterwards and answer questions

W1: Information Does Exist Beyond the First Page of Your Google® Search!  
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## Why Search and Read the Forensic Science Literature?

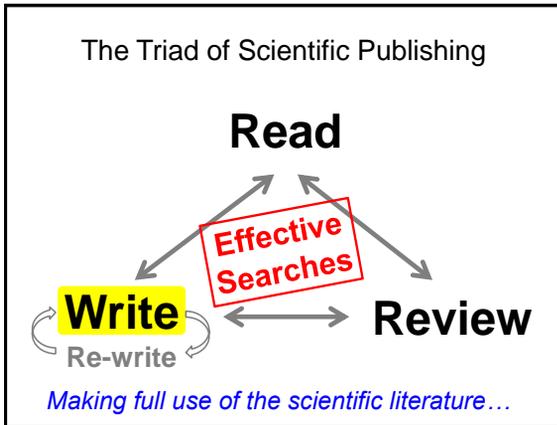
**John M. Butler**  
 NIST Fellow & Special Assistant to the Director for Forensic Science  
 National Institute of Standards and Technology



### Greg Matheson on Forensic Science Philosophy

The CAC News – 2<sup>nd</sup> Quarter 2012 – p. 6  
 "Generalist vs. Specialist: a Philosophical Approach"  
<http://www.cacnews.org/news/2ndq12.pdf>

"If you want to be a technician, performing tests on requests, then just focus on the policies and procedures of your laboratory. **If you want to be a scientist and a professional**, learn the policies and procedures, but go much further and learn the philosophy of your profession. **Understand the importance of why things are done** the way they are done, the scientific method, the viewpoint of the critiques, the issues of bias and the importance of ethics."



### What I have written on this topic...



The triad of scientific publication: Reading, writing, and reviewing

John M. Butler<sup>\*</sup>  
 National Institute of Standards and Technology, Gaithersburg, MD, USA

... "An important purpose of scientific publication is to document work performed to aid the advancement of science. In short, writing enables history."

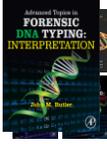
... "Reviewing manuscripts is a chance to influence the community for good and to provide service back to journals..."



### My Qualifications on this Topic

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- Degrees in chemistry
  - BYU (B.S., 1992), University of Virginia (Ph.D., 1995)
  - Undergraduate classes on scientific writing and public speaking
- Research-focused career
  - Published >150 articles and invited book chapters
  - Given >300 presentations on scientific topics
- Love for teaching
  - More than 50 workshops on DNA topics
  - Written five books (so far) on forensic DNA typing
- Active reviewer and journal editor responsibilities
  - Associate editor of *Forensic Science International: Genetics* since 2007
  - Reviewed hundreds of articles for >20 different journals
- Avid lifelong reader of history and science
  - Read >2,000 books and thousands of articles





Named by ScienceWatch in July 2011, as the #1 world-wide high-impact author in legal medicine and forensic science over the previous decade

# Reading Scientific Articles: Why and How?

### Why Read the Literature?

- Reading the relevant literature is crucial to developing expertise in a scientific field
- You must keep reading to be familiar with advances that are regularly being made
- **Your writing improves the more you read**
  - Being widely read in your field helps you prepare **relevant reference lists** and **insightful introductions** to your manuscripts
- Your ability to review other's work will improve...

### FBI Quality Assurance Standards

#### Requirement for Literature Review with DNA Labs

Quality Assurance Standards for Forensic DNA Testing Laboratories  
(effective September 1, 2011)

**5.1.3.2.** The laboratory shall have **a program** approved by the technical leader **for the annual review of scientific literature that documents the analysts' ongoing reading of scientific literature.** **The laboratory shall maintain or have physical or electronic access to a collection of current books, reviewed journals, or other literature applicable to DNA analysis.**

<http://www.fbi.gov/about-us/lab/biometric-analysis/codis/qas-standards-for-forensic-dna-testing-laboratories-effective-9-1-2011>

### Benefits of Reading the Literature

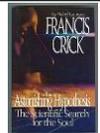
- You become familiar with authors and institutions
- You can improve as a writer and a presenter
- Your laboratory can improve its protocols
- Over time you will be building your knowledge
  - In graduate school, I read over 100 articles on PCR before I ever did a single experiment
  - I have gathered and cataloged ~9,000 articles over the last 20 years of work in the forensic DNA field
  - My books include reference lists that are as comprehensive as possible (because of this reference collection)
- Remember: **You don't have to master every paper...**

**How many scientific articles have you read recently?**



Francis Crick

*The Astonishing Hypothesis* (1994), page xiii



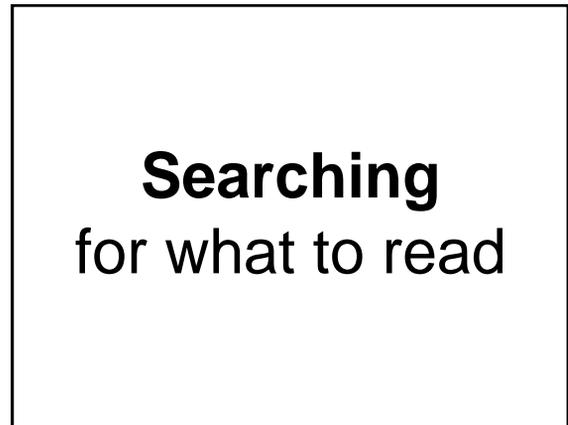
“There is no form of prose more difficult to understand and more tedious to read than the average scientific paper.”

### My thoughts on how to read a scientific article

- Skim the article first
  - Start with title and abstract (may consider authors as well)
  - Scan tables, figures and figure captions
- Examine results and conclusions
  - Do the data presented support the statements made?
- Do not worry about trying to comprehend the entire article at first
  - Most articles will be skimmed rather than read from start to finish
- Highlight key points and make notes on the paper itself so you can go back to them later to refresh your memory

### Journal Clubs

- Do you have one in your laboratory?
- How often do you meet?
- Is it effective?



### Approaches to Retrieving Information

- **Passive reading**
  - You just happen to come across something interesting while browsing a journal that comes across your desk
- **Active searching** on a specific topic
  - Online tools (free resources and subscription databases)
  - Search strategies and key words used make a difference
- **Automated information push** from key words
  - Subscribing to a website RSS (rich site summary) feed informs you as the user to receive notification of any updates to the site based on key words provided

### Selecting What to Read...

- Review entire journal listing of articles
  - Examine journal issue or view table of contents on-line
- Perform directed searches on specific topics
  - PubMed <http://www.ncbi.nlm.nih.gov/PubMed>
  - Web of Science <http://apps.webofknowledge.com>
- Sign up for table of contents delivery via email
- **Examine publications cited in review articles**

### Review Articles and Citations in Volume 18 *Special Issue: New Trends in Forensic Genetics*

Author(s)	Topic	Total Citations
J.M. Butler	Introduction and issue summary	14
J.M. Butler	U.S. initiatives to strengthen forensic science	141
T. Sijen	Molecular approaches for forensic cell type identification	153
M. Kayser	Forensic DNA phenotyping	100
C. Phillips	Bio-geographical ancestry	111
R. Cotton & M. Fisher	Sperm & seminal fluid properties	102
C. Barrsting & N. Morling	Next generation sequencing	94
E. Romsoos & P. Vallone	Rapid PCR of STR markers	118
P. Gill et al.	Historical overview of STR genotyping and interpretation	177
K. Gettings et al.	STR allele sequence variation	110
R. Just et al.	Mitochondrial DNA heteroplasmy & NGS	88
T.M. Diegoli	STR markers on the X and Y chromosomes	248
R. Ogden & A. Linacre	Wildlife forensic science & genetic geographic origin assignment	63
M. Brion et al.	Molecular autopsy & NGS	72

**1591 references cited in these 14 articles**

### Contributions from Focused Meetings From a UK Royal Society Meeting Held in London February 2015

**PHILOSOPHICAL TRANSACTIONS B**

[rsta.royalsocietypublishing.org](http://rsta.royalsocietypublishing.org)

Opinion piece

**CrossMark**

**Cite this article:** Butler JM. 2015 The future of forensic DNA analysis. *Phil. Trans. R. Soc. B* 370: 20140252. <https://doi.org/10.1098/rstb.2014.0252>

Accepted: 26 February 2015

One contribution of 15 to a discussion meeting issue 'The paradigm shift for UK forensic science'.

**The future of forensic DNA analysis**

John M. Butler

National Institute of Standards and Technology, Gaithersburg, MD, USA

The author's thoughts and opinions on where the field of forensic DNA testing is headed for the next decade are provided in the context of where the field has come over the past 30 years. Similar to the Olympic motto of 'faster, higher, stronger', forensic DNA protocols can be expected to become more rapid and sensitive and provide stronger investigative potential. New short

**Email author to request a copy**  
[john.butler@nist.gov](mailto:john.butler@nist.gov)

will impact the future of forensic DNA are explored including the need for education and training to improve interpretation of complex DNA profiles.

<https://royalsociety.org/events/2015/02/forensic-science/>

# Storage & Retrieval

## Curation of Collected Articles

- I collect digital copies of articles and have dedicated folders on my desktop computer
- I prefer to read an article from a printed copy so that I can make notes on it
- Do you have piles of paper in your office?
  - If so, how do you find information when you need it later?
- Do you have an organized filing system that enables efficient retrieval of articles and information you have collected in the past?
  - Upfront curation and classification will improve retrieval

## Creating a Reference Collection



- My forensic DNA reference collection began while I was in graduate school
  - Continued over the years with the help of student interns like Christian Ruitberg shown here
- Mostly printed copies of articles are stored
  - has increasing become digital (this part is not as well organized)

## Reference Management Systems

THOMSON REUTERS

**ENDNOTE**  
The most powerful tool for managing your research.

Collect. Collaborate. Create. From Anywhere.

<http://www.refman.com/> <http://www.endnote.com/>

- Article information storage and search retrieval
- Reference formatting for different journals

Develop a system and strategy that works for you to store information

## Reference Manager Database

As of Aug 2013: 5115 references in AllRef and 3683 references in STR\_Ref

**8,798 references cataloged**

Ref ID	Authors	Title
2163	Butler, J.M.	Forensic DNA typing by capillary electrophoresis using the ABI Prism 310 and 3100 genetic analyzers for STR analysis
2201	Butler, J.M.	Duplication of DYS19 flanking regions in other parts of the Y chromosome
2461	Butler, J.M.	Locus-specific brackets for reliable typing of Y-chromosome short tandem repeat markers
2477	Butler, J.M.	Chromosomal duplications along the Y-chromosome and their potential impact on Y-STR interpretation
2492	Butler, J.M.	U.S. population data for the multi-copy Y-STR locus DYS664
2550	Butler, J.M.	Allele frequencies for 27 Y-STR loci with U.S. Caucasian, African American, and Hispanic samples
2605	Butler, J.M.	Genetics and genomics of core short tandem repeat loci used in human identity testing
3015	Butler, J.M.	Short tandem repeat typing technologies used in human identity testing
3036	Butler, J.M.	STRs vs. SNPs: thoughts on the future of forensic DNA testing

## Strategies for Scientific Literature Collection and Curation

- Use electronic papers only
- **Put everything into a single file** (e.g., AllRef)
  - use keywords or authors to find specific articles
- **Create separate files for individual projects**
  - Classification problems can arise if an article could possible fit into multiple projects

## Fruits of a Good Literature Collection

### Review Articles

John M. Butler, Ph.D.  
 Genetics and Genomics of Core Short Tandem Repeat Loci Used in Human Identity Testing

*Analytical Chemistry* (June 15, 2007 issue)

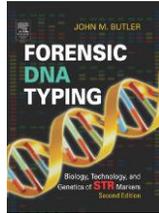
### Forensic Science

T. A. Brettell\*  
 Department of Chemical and Physical Sciences, Cedar Crest College, 100 College Drive, Allentown, Pennsylvania 18104-9199

J. M. Butler  
 Biomedical Science Division, National Institute of Standards and Technology, Gaithersburg, Maryland 20899-8311

J. R. Almirall  
 Department of Chemistry and Biochemistry and International Forensic Research Institute, Florida International University, University Park, Miami, Florida 33199

### Textbooks



2nd Edition 688 pp.  
 Feb 2005

## Butler Books on Forensic DNA Typing

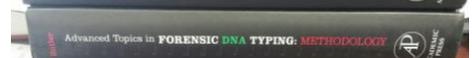
*Fairly comprehensive reference citations are provided with each topic and chapter*

Publication Year

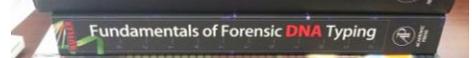
2015



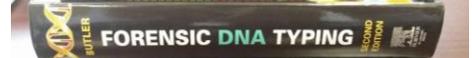
2012



2010



2005



2001



## And a Useful Reference Website...

# Writing Scientific Articles

## Why you need to write up your work

- Peer-review usually generates higher-quality information (but the quality control is not perfect)
- Talks are not held to the same standard as a written publication (that has been peer-reviewed)
- A written publication is also accessible to those who did not attend a presentation and is archived for future scientists to read

## Why Publish Scientific Articles?

- To spread information and share new knowledge with others
- To gain recognition, success and prestige for the authors and their institutions
- To win promotion to higher positions, job security, and tenure within academia
- To enhance chances of obtaining grants and research funding
- To gain priority for making a discovery

From Prof. Wayne Jones presentation at 19<sup>th</sup> IAFS meeting (Madeira, Portugal), 15 Sept 2011  
 "Publishing in Forensic Sciences: Where and How to Publish and the Meaning of Numbers"



## The Science of Scientific Writing

George Gopen & Judith Swan (1990)

<http://www.americanscientist.org/issues/pub/the-science-of-scientific-writing>

**Some Recommendations to Improve Accessibility:**

- 1) Put grammatical subjects close to their verbs
- 2) Put information intended to be emphasized towards the end of a sentence (the **stress position**)
- 3) Place the person or thing whose “story” a sentence is telling at the beginning of the sentence (the **topic position**)
- 4) Provide context for the reader before sharing anything new

Gopen, G.D., & Swan, J.A. (1990). The science of scientific writing. *American Scientist*, 78, 550-558

<http://www.ees.elsevier.com/fgigen/>

### Forensic Science International: Genetics

Welcome to the online submission and editorial system for *Forensic Science International: Genetics*.

*FSI: Genetics* will be specifically devoted to Forensic Genetics. This branch of Forensic Science can be defined as the application of Genetics (in the sense of a science with the purpose of studying inherited characteristics for the analysis of inter- and intraspecific variations in populations) for the resolution of legal conflicts. This includes paternity testing, criminal casework, and identification of human remains. Although protein and enzyme polymorphisms were firstly used to fulfill the aims of the field they have been substituted nowadays by DNA polymorphisms analyzed by a variety of molecular biological typing technologies. The amount of work in this field has increased enormously with no signs of slowing down with many new applications such as the application to non-human DNA material (crime scene, illegal trade in endangered species evidences, and bioterrorism) and the building and appropriate management of DNA databases.

The scope of the journal includes:

- Forensic applications of human polymorphism: testing of paternity and other family relationships, immigration cases, typing of biological stains and tissues from

**Author Information**

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[Authors' Home](#)  
[Guide for Authors](#)  
[Tutorial for Authors](#)  
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[Compliance](#)  
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[Authors' Update](#)

**Reviewer Information**

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## The Elsevier Publishing Campus

<https://www.publishingcampus.elsevier.com/>



Free lectures, training and advice in:

- **writing** a journal article or book,
- learning **how to conduct peer review**,
- **understanding** research and publishing **ethics**
- **preparing a successful grant application**

## Ranking of the Value and Relevance of Scientific Writing

**Lesser value**



**Greater value**

- Website blogs and opinion pieces
- Non-peer reviewed articles
  - Conference proceedings
  - Letters to the editor
  - Many review articles
- Peer-reviewed research articles – with data!
- **Highly cited scientific articles**
  - Shows support from other scientists over time
  - **Truly a measure of “scientific acceptance”**

## Bibliometrics

efforts to measure scientific productivity in an academic world of “Publish or Perish”

- **Impact factor (for journals)** [http://en.wikipedia.org/wiki/Impact\\_factor](http://en.wikipedia.org/wiki/Impact_factor)
  - a measure of the citations to science journals
  - can reflect relative importance of a journal to its field
  - devised by Eugene Garfield, the founder of the Institute for Scientific Information
  - calculated yearly starting from 1975 for those journals that are indexed in the *Journal Citation Reports*
- **h-index (for authors)** <http://en.wikipedia.org/wiki/H-index>
  - described in 2005 by Jorge Hirsch (*Proc Natl Acad Sci* 102: 16569-16572)
  - an attempt to measure an author’s productivity and impact
  - based on a list of an author’s publications ranked in descending order by the number of times each publication is cited
  - value of h is equal to the number of papers (N) in the list that have N or more citations

## Impact Factor of a Journal



Eugene Garfield

- Concept first described in 1955 and developed by Eugene Garfield
- Reflects the average number of citations to recent articles published in the journal
- An impact factor for 2012 (released in 2013)

**The number of times that articles published in the journal in 2010 and 2011 were cited by articles in indexed journal during 2012**

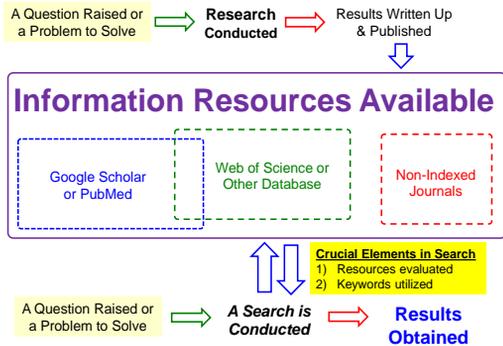
**The total number of “citable items” published in that journal in 2010 and 2011**

See Garfield, E. (2006). The history and meaning of the journal impact factor. *Journal of the American Medical Association* 295: 90-93

### My Overall Summary Thoughts

- READ** • The best preparation to write well is to **critically read a lot of papers**
- WRITE** • **Writing well takes practice** and is one of the most valuable skills you can develop
  - Effective communication benefits scientific advancement
- REVIEW** • **Help review** the work of other scientists
  - As an editor, I appreciate your willingness to be a reviewer when you are asked to help
  - An important way to give back to the community

### “Ecosystem” of Scientific Knowledge



### Thank you for your attention!

- Acknowledgments:
  - Funding from NIST Special Programs Office Forensic Science Program



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[john.butler@nist.gov](mailto:john.butler@nist.gov)  
 301-975-4049

A copy of this presentation will be made available at:  
<http://www.cstl.nist.gov/strbase/NISTpub.htm>



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**Free Forensic Science Information Resources for the Practitioner**

**Jeff Teitelbaum**  
 Librarian, Forensic Laboratory Services Bureau  
 Washington State Patrol

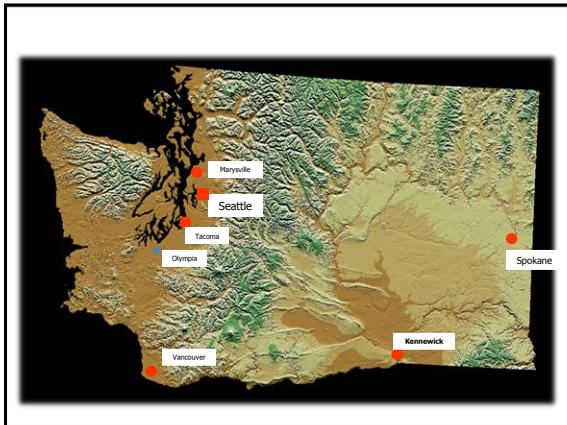




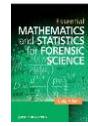




Forensic Laboratory Services Bureau

What do we want?

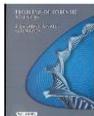




New research

Forensic Science Open Access Journals









Forensic Science newsletters










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### PUBLIC LIBRARIES



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### PUBLIC LIBRARIES



**Document  
Delivery**

Document delivery



GALE  
General  
OneFile

Database access



Electronic journals

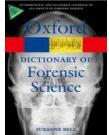


Books

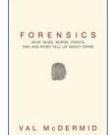


EBOOK

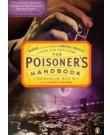
### E-books – PUBLIC LIBRARY



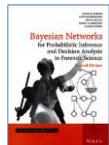
Oxford  
Journals  
Dictionary of  
Forensic  
Science



FORENSICS  
VAL McDERMID



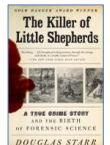
POISONER'S  
HANDBOOK



Bayesian Networks  
for Probabilistic Inference  
and Decision Analysis  
in Forensic Science



EVILED  
EVIDENCE



The Killer of  
Little Shepherds  
A TRUE CRIME STORY  
AND THE BIRTH  
OF FORENSIC SCIENCE  
DOUGLAS STARR

### Online databases – PUBLIC LIBRARIES



ProQuest  
RESEARCH LIBRARY



ProQuest  
National Newspapers Core



Academic OneFile



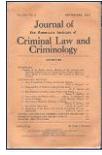
LegalTrac

### Online databases – PUBLIC LIBRARIES



JSTOR





Journal of  
Criminal Law and  
Criminology

## Electronic journals – PUBLIC LIBRARY

FULL TEXT ELECTRONIC JOURNAL HOLDINGS

0-9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z OTHER

Title begins with

-- Please select a subject category --

1 record retrieved for the search: Title begins with "forensic science international"

Forensic science international (0379-0738) [Look up Article](#) [More full text options](#)  
 from 01/01/2003 to 2 months ago in [ProQuest Research Library](#)  
 from 01/06/2004 to 12/20/2006 in [Academic OneFile](#), [General OneFile](#) and [LegalTrac](#)

## Free full-text article



The screenshot shows a journal article page for 'Forensic Science International'. A red box highlights the 'Full Text' button, indicating that the full text of the article is available for free access.

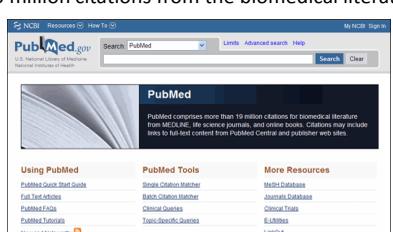
## UNIVERSITY LIBRARY

- Complete access to book and journal collections
- Access to electronic databases
- State government employees can obtain library card to borrow books

## PubMed

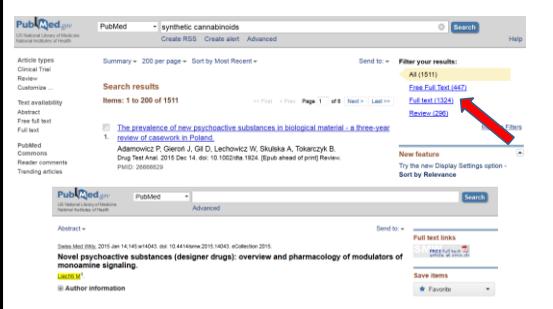
### US National Library of Medicine

25 million citations from the biomedical literature



The screenshot shows the PubMed homepage with the search bar and navigation links. A red arrow points to the search bar.

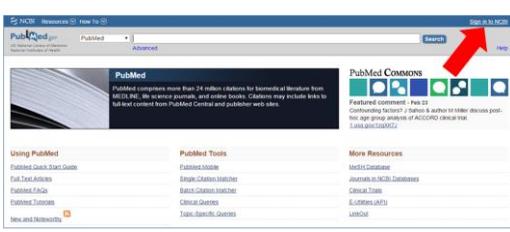
## PubMed identifies free full-text articles



The screenshot shows a search result for 'synthetic cannabinoids'. A red arrow points to the 'Full Text (1324)' link, indicating that there are 1324 full-text articles available for this search.

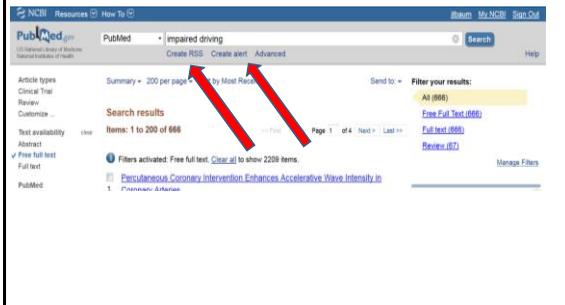
## Set up your personal MyNCBI account

- Create alerts/RSS feeds
- Customized subject collections



The screenshot shows the MyNCBI account setup page. A red arrow points to the 'Sign In to NCBI' button, indicating the next step in the process.

## PubMed Alerts/RSS



## RSS Readers



- Article “rental” service
- Partnered with Elsevier, Springer, Nature, etc.
- 12 million articles in current catalog
- Monthly plan includes:
  - Read unlimited articles (no downloading)
  - Print 20 pages per month



- 5 minutes free preview:
- Log in to your free account
  - Locate your article

### Novel psychoactive substances (NPS): clinical and pharmacological issues

Drugs and Alcohol Today, volume 10 (1) - Mar 2, 2015

Read Article  
Download PDF \$30  
7 pages



Click on “Free Preview”

Read this Article



Novel psychoactive substances (NPS): clinical and pharmacological issues

Read 5 articles for just \$20

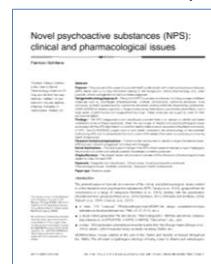
Free Preview

Read unlimited articles

Read articles online, anywhere, in your browser. Copying, printing, and downloading aren't included.



5 minute free full-text preview





More than 220,000 records  
 Large percentage free PDF's

- Criminal justice
- Forensic sciences
- Substance abuse
- Journal indices

### NCJRS search interface

**Search the NCJRS Abstracts Database**

The NCJRS Abstracts Database contains more than 220,000 collection records for criminal justice, juvenile justice, and substance abuse resources housed in the NCJRS Virtual Library collection. This includes more than 60,000 online resources and all known Office of Justice Programs works.

Tell us how you use the NCJRS Abstracts Database. Send us your Feedback.

Choose a search type  All  Any  Phrase and enter your search below

Title   
 Author   
 Journal Name   
 NCJ Number   
 Numbers Only   
 General Search

Language   
 Date Range  -

Start Date  End Date   
(Enter date as mm/yyyy for example: 10/2002.)



### Current research

**Bloodstain Patterns on Textile Surfaces: A Fundamental Analysis**  
 Stephen Michielsens, Michael Taylor, et al; 2015

**Exploitation of Very Small Particles to Enhance the Probative Value of Carpet Fibers**  
 David A. Stoney, Ph.D., Paul L. Stoney, MBA, Cedric Neumann, Ph.D.; 2015

**Human Hair Proteomics - Improved Evidence Discrimination**  
 Robert H. Rice, Pei-Wen Wu, Selena M. Mann; 2015

**Improved Detection of Synthetic Cathinones in Forensic Toxicology Samples: Thermal Degradation and Analytical Considerations**  
 Sarah Kerrigan, Ph.D.; 2015

**Low-Template DNA Mixture Interpretation: Determining the Number of Contributors**  
 Catherine Grgicak, Ph.D.; 2015

**Tools for Improving the Quality of Aged, Degraded, Damaged, or Otherwise Compromised DNA Evidence**  
 Michael M. Cox, Ph.D., Evelyn M. Mercer; 2015

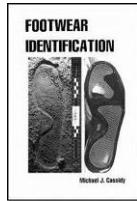


### Older research

**Flight characteristics and stain patterns of human blood**  
 H.L. MacDonell; 1971

**Methods for the Restoration of Obliterated Serial Numbers**  
 R. S. Treptow; 1977

**Footwear Identification**  
 Michael J. Cassidy; 1980



Free to subscribe

**FLSB Library email list**

Jeff.Teitelbaum@wsp.wa.gov


**W1: Information Does Exist Beyond the First Page of Your Google® Search!**  
 American Academy of Forensic Sciences  
 Las Vegas, NV (February 22, 2016)
 

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## Tools for Searching and Analyzing the Forensic Science Literature

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**Susan Makar & Amanda Malanowski**  
 Research Librarian & Program Analyst, Information Services Office  
 National Institute of Standards and Technology






## National Institute of Standards and Technology

- Non-regulatory federal agency made up of about 3,000 science and technology researchers
- NIST promotes U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology
- The Information Services Office (ISO) supports and enhances research activities of the NIST scientific community through a comprehensive program of knowledge management

## Overview

- Tools and search strategies for finding forensic publications
  - Web of Science – multidisciplinary sciences
  - SciFinder – chemistry and related areas
  - Compendex – engineering, computer science, etc.
  - LexisNexis – legal and news
- Impact assessment
- Data visualization tools

Note: The identification of any commercial product or trade name does not imply endorsement or recommendation by the National Institute of Standards and Technology.

## Database Search Tips – Getting Started

- Write down the **key concepts** you want to focus on
- Limit to past **5 years**, **English** language articles, as an initial way to focus and narrow results
- As you search, **write down** synonyms, keywords, controlled vocabulary, classification codes
- Look at the number of search results – if too many, **try to narrow**
- Use **abstract and assigned keywords** to determine potential relevance

## Web of Science

- An online subscription-based resource that indexes the science and technology literature, including citations and abstracts to peer-reviewed journal articles and some conference proceedings
- Fully covers over 8,300 journals across 150 scientific disciplines; 1900 to present
- Analyze the sci-tech literature using “Analyze Results” and “Create Citation Report” features

## Web of Science

- When to use
  - Good starting point for any forensics topic because of its interdisciplinary coverage
  - Covers the peer-reviewed journal literature
    - Author searches to determine credibility/expertise
  - Historical coverage back to 1900
    - Early forensics research
  - Unusual topics that might not be covered in other subject-specific databases; examples include:
    - Wildlife forensics
    - Latent prints

### Web of Science – Begin Search

Basic Search

forensic\* Topic

AND ballistic or firearm\* or gun\* Topic Search

From 2010 to 2015

- Identify key concepts – forensics AND ballistics
- Identify synonyms – firearms and guns, in addition to ballistics
- Truncate terms to pick up word variations – gun\* retrieves gunshot, gunpowder, gun, guns, etc.
- Select time span – how current do you want your papers?

### Web of Science – Select Spot-on Paper

Results: 480

You searched for: TOPIC: forensic\* AND TOPIC: ballistic or firearm\* or gun\* AND

1. The influence of 1.5 and 2 T magnetic resonance unit magnetic fields on the movement of steel-jacketed projectiles in ordnance gelatin

2. Fantastic plastic? Experimental evaluation of polyurethane bone substitutes as proxies for human bone in trauma simulations

3. Variation of gunshot injury patterns in mortality associated with human rights abuses and armed conflict: an exploratory study

4. Imaging for necrotic investigations

Scan list of articles to find a spot-on paper

### Web of Science – Expand Search

Fantastic plastic? Experimental evaluation of polyurethane bone substitutes as proxies for human bone in trauma simulations

Smith, M.J. (Smith, Martin J.)<sup>1</sup>; James, S. (James, Stephen)<sup>2</sup>; Poon, T. (Poon, Tim)<sup>3</sup>; Ball, R. (Ball, David)<sup>1</sup>; Barnerton, V. (Barnerton, Victoria)<sup>1</sup>; Foster, B. (Foster, Barbara)<sup>1</sup>; Gray, C. (Gray, Carl)<sup>1</sup>; Rickman, J. (Rickman, John)<sup>1</sup>; Walton, V. (Walton, Virginia)<sup>1</sup>

LEGAL MEDICINE  
Volume: 17 Issue: 5 Pages: 427-435  
doi: 10.1016/j.legmed.2015.06.007  
Published: SEP 2015

Abstract  
Recent years have seen steady improvements in the recognition and interpretation of violence related injuries in human skeletal remains. Such work has at times benefited from the involvement of biological anthropologists in forensic casework and has often relied upon comparison of documented examples with trauma observed in related scenarios. In cases where no such example exists, investigators must turn to experimentation. The selection of experimental samples is problematic as animal proxies may be too dissimilar to humans and human cadavers may be undesirable for a raft of reasons. The current article examines a tried alternative in the form of polyurethane plates and spheres interpreted as viable proxies for human bone in ballistic experiments. Through subjecting these samples to a range of impacts from both modern and antique missile weapons it was established that such material generally responds similarly to bone on a broad, macroscopic scale but when examined in closer detail exhibits a range of dissimilarities that still for caution in extrapolating such results to real bone. © 2015 Elsevier Ireland Ltd. All rights reserved.

Keywords  
Author Keywords: forensic; Anthropology; Trauma; Gunshot; Head injury; Synthetic bone substitutes  
KeyWords Plus: SKULL; BROW MODEL; GUNSHOT WOUNDS; BALLISTIC GELATIN; FURNISE; HEAD

Citation Network  
Times Cited: 47  
Cited References: 47  
View Related Records

All Times Cited Counts  
0 in All Databases  
0 in Web of Science Core Collection  
0 in BIOSIS Citation Index  
0 in Chemical Science Citation Database  
0 in Data Citation Index  
0 in Russian Science Citation Index  
0 in Scopus Database

Usage Count  
Last 180 Days: 7  
Since 2010: 7

- Scan article record for other keywords and search terms
- Check the paper's references and "Related Records"

### SciFinder

- A research discovery application that provides integrated access to references, substances, and reactions in chemistry and related sciences
  - Search for references by research topic, author, company, document identifier, journal, or patent
  - Search for chemical substances by chemical structure, molecular formula, property, or substance identifier
- Requires a username and password
- SciFinder training page offers tutorials and other materials

### SciFinder

- When to use SciFinder
  - Chemistry-related forensics topics
  - Coverage beyond peer-reviewed journal articles
    - Conference papers
    - Patent literature
  - Chemical compound information
- Topic areas
  - Forensic toxicology
  - Forensic chemistry
  - Forensic medicine

### SciFinder – Welcome Screen

SciFinder®  
The choice for chemistry research.™

Sign In  
Username: [ ]  
Password: [ ]  
Remember me (Do not use on a shared computer)  
Sign In  
Forgot username or password?  
Your SciFinder username and password are assigned to you alone and may not be shared with anyone else.  
New to SciFinder?  
Learn more about getting access to SciFinder.

News & Updates  
Welcome to SciFinder  
CHEMISTS Chemical Supplier Program  
Chemical suppliers for part of the world's products chemistry research solution. Learn more now.  
Introducing the PatentPlus Interactive Patent Chemistry Viewer  
The new PatentPlus interactive patent chemistry viewer significantly reduces the time spent locating the important chemistry it is based on using CAS identifier-based links to key publications in the same journal.  
New Commercial Source Engines  
The new online supplier lists in Commercial SourceHelp.  
Have you visited the SciFinder training page lately?  
Our new materials and updated tutorials will help you navigate a SciFinder region. See our new recorded webinars on journal and patent searching, CAS identifier search and updated substances, reaction and reference searching features (now also in Spanish).

- Requires a username and password
- SciFinder training page offers tutorials and other materials

### SciFinder – Natural Language Search

Research Topic "the forensics of human identif..."

REFERENCES: RESEARCH TOPIC

the forensics of human identification

Examples:  
The effect of antibiotic residues on dairy products  
Photocyanation of aromatic compounds

Search

Advanced Search

- Only option is to use "natural language" to conduct a search
- Complex searches are difficult to perform in SciFinder

### SciFinder – Select Concept Relationship

Select All Deselect All

1 of 8 Research Topic Candidates Selected

Reference	References
<input type="checkbox"/> 1 reference found containing "the forensics of human identification" in entered.	
<input checked="" type="checkbox"/> 1394 records were found containing the two concepts "forensics" and "human identification" closely associated with one another.	1394
<input type="checkbox"/> 3722 references were found where the two concepts "forensics" and "human identification" were present anywhere in the reference.	3722
<input type="checkbox"/> 98128 references were found containing the concept "forensics".	98128
<input type="checkbox"/> 589974 references were found containing the concept "human identification".	589974

Get References

- Exact phrase is too specific – yields only one record
- Two concepts present anywhere in the reference is too broad and not always on target
- Two concepts "closely associated with one another" is generally the best answer set

### SciFinder – Analyze and Refine Results

Research Topic "the forensics of human identif..." > references (1398)

REFERENCES

Analyze Refine Categories

Sort by: Accession Number

0 of 1398 References Selected

Author Name	Journal	Accession Number
Budoville Bruce		28
Schneider P M		18
Carrazcedo A		17
Moring H		14
Jianov P L		12
Shivale Jaiprakash		11
Sakurada Koichi		10

- Analyze your search by Author, Company, Journal, etc.
- Refine by Research Topic, Author, Company Name, etc.

### Compendex

- Indexes the engineering literature
- Strong in the applied sciences
- Scope
  - Broad literature database
  - 17+ million papers
  - 80,000 conference proceedings
  - 3,800 journals
- Controlled vocabulary enables you to find the most relevant articles with few false hits

### Compendex

- When to use Compendex
  - Computer forensics and related topics
  - Coverage beyond the peer-reviewed journal literature
    - Conference papers
    - Technical reports
- Topic areas
  - Computer forensics
  - Computer crime
  - Digital evidence

### Compendex – Use Thesaurus

Quick Search Expert Search Thesaurus Search

SEARCH FOR

AND

IN

Search

- The Thesaurus Search helps to eliminate false hits since each article is indexed using a term or terms from a controlled vocabulary list
- Not all databases/resources have the valuable thesaurus search feature

### Compendex – Select Thesaurus Terms

Thesaurus Search results for forensics are limited to computer and digital/data related papers

### Compendex – Search Results

- Results can be refined using the filters on the left
- Many filters are available – Author, Author Affiliation, etc.
- Note the source title "Digital Investigation," which is the source with the most papers on topic

### LexisNexis

- Use Nexis to search across over 26,000 current and archived sources, including trusted news, company profiles, public records, industry information and social media content
- Lexis content includes Federal and State Cases, Statutes, Codes, and Regulations; Legislative Materials; Court Dockets; Court Materials; and more
- Subscription based – check with your library for access

### LexisNexis

- When to use LexisNexis
  - Forensics topics related to industry/business
  - Litigation involving forensics
  - Coverage of the non-technical literature
    - Legal literature
    - News sources
    - Patent literature
- Topic areas
  - Forensics experts and litigation
  - Global forensic technologies market
  - Cybercrime

### Nexis – Begin Search

- Use the Natural Language search option to type in key concepts
- Various filters help to refine search

### Nexis – Use Filters to Narrow Search

- Use filters on the left to refine search results
- Filter by Source Type, Subject, Industry, Company, etc.

### Nexis – Limit by Subject

### Nexis – Search Results

The Ellwood City Ledger (Pennsylvania)  
April 12, 2011 Tuesday

She's watching your p's and q's;  
Fascination with **handwriting** draws woman into document investigation

**BYLINE:** Louise Carroll, LEDGER CORRESPONDENT

**SECTION:** NEWS; Pg. 1

**LENGTH:** 681 words

The size of the letters. The slant of the line. How and where the "ts" are crossed and the "ys" are dotted. How much pressure is applied to the stroke. The truth, Therese McShea said, is in the details. McShea, 46, of Wayne Township, is a **handwriting** analyst. She first became interested 10 years ago when her mother bought her a couple of books on the subject. From there, it's become a consuming interest. She's taken courses and seminars to learn her trade. For more than a year, she's been enrolled in the International Document Examination to study **forensic** analysis. But **handwriting** analysis and **forensic handwriting** analysis are two very different things. **Handwriting** analysis, also known as graphology, is a method of identifying, evaluating and understanding a person's personality through his **handwriting**. **Forensic handwriting** analysis answers questions about a disputed document, such as authenticity of a signature.

Full-text documents

### Lessons Learned

- Forensic science crosses many disciplines from legal medicine and chemistry to computer science, food science technology, and materials science.
- It is virtually impossible to identify each and every paper on a forensics topic due to the interdisciplinary nature of forensics.
- There is no single resource that captures all the forensic literature, and most resources have only fair to good coverage of forensics.

### Web of Science Search String

WC="Medicine, Legal"  
AND  
ORGANIZATION-ENHANCED: (National Institute of Standards & Technology (NIST) - USA)  
  
OR  
  
TOPIC (Forensic\* OR "legal medicine" OR medicolegal OR autopsy OR "blood stains" OR dermatoglyphics OR "DNA fingerprint" OR exhumation OR ballistics OR "computer crime" OR "electronic crime" OR "electronic evidence" OR "cyber crime" OR "digital investigation" OR "digital evidence" OR "intrusion analysis" OR "dna typing" OR "dna profiling") AND ORGANIZATION-ENHANCED: (National Institute of Standards & Technology (NIST) - USA)

### Impact Assessment

- What is the impact of your work or research?
- How can assessing impact help?
  - Helps obtain funding
  - Demonstrates the value of your work to your stakeholders
- When would it be useful?
  - Investigating new research areas
  - Defending your research group in times of budget cuts
- Ask your librarian to help!

### Impact Assessment in the NIST Information Services Office

- What types of analyses do we do?
  - Citation analysis and publication assessment
  - Market research and analysis
  - Research impact measurement
  - Publication venue analysis
- Examples of the analyses we do related to forensics
  - Information on databases, books, and research groups in the area of forensic identification of fibers
  - What is the impact of NIST's forensic publications?

## Forensics@NIST 2014

**Assessing the Impact of the National Institute of Standards and Technology's Forensic Publications and Collaborations**

## Impact Assessment

**Number of Times Cited**

- 2,276
- 678
- 1

**Forensic Subdisciplines**

- Population Genetics
- DNA
- Fingerprinting
- Nuclear Forensics
- SRMs
- Ballistics
- GSK/Explosives
- Fire Forensics

**Number of Co-Authored Papers**

- 19 papers
- 6 papers
- 2 papers

## Tableau

- Tableau Public – free version
- Drag and drop interface is intuitive and enables quick and iterative data manipulation and visualization
- Geospatial maps, heat maps, area graphs, bubble graphs, and dashboards

## Science of Science Tool (Sci<sup>2</sup>)

- Created at Indiana University
- Temporal, geospatial, topical, and network analysis and visualization of scholarly datasets
- Data prep tool for:
  - Web of Science
  - Google Scholar

## Gephi

- Interactive visualization and exploration platform for networks and complex systems, dynamic and hierarchical graphs
- Helps show patterns and isolate outliers

## Questions?

Contact:  
Susan Makar  
[susan.makar@nist.gov](mailto:susan.makar@nist.gov)

Amanda Malanowski  
[amanda@malanowski@nist.gov](mailto:amanda@malanowski@nist.gov)

W1: Information Does Exist Beyond the First Page of Your Google® Search!  
 American Academy of Forensic Sciences  
 Las Vegas, NV (February 22, 2016)

# Case Examples 1

**Jeff Teitelbaum**  
 Washington State Patrol

## Question to Research

What are the effects of mouth alcohol on breathalyzer tests?

An Improved Forensic Science Information Search

J. Teitelbaum  
 Forensic Science Library Services  
 Forensic Laboratory Services Division  
 Washington State Patrol  
 Seattle, Washington  
 United States of America

Article provided in workshop materials

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 Jeff.Teitelbaum@wsp.wa.gov

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## Recap of resources and techniques

**Google operators:**

**mouth alcohol**

mouth AND alcohol  
 mouth OR alcohol  
 "mouth alcohol"  
 "mouth alcohol" ext:pdf  
 "mouth alcohol" ext:ppt  
 "mouth alcohol" -lawyers  
 "mouth alcohol" site:.gov or site:.edu  
 "mouth alcohol" site:nhtsa.gov

- To return specific file types:  
**ext:pdf**    **ext:ppt**  
 impaired driving ext:pdf
- To search specific types of websites:  
**site:.gov**    **site:.edu**  
 impaired driving site:nhtsa.gov



Using ext:pdf in Scholar will often retrieve different full-text articles than Google

## Accessing Google Scholar Advanced Search



Hover or click mouse here

Articles (2 include patents)  Case  Advanced Scholar Search

### Google books Advanced Book Search

Find results	with all of the words	<input type="text"/>
	with the exact phrase	<input type="text"/>
	with at least one of the words	<input type="text"/>
	without the words	<input type="text"/>

Search:  All books  Limited preview and full view  Full view only  Google eBooks only

Content:  All content  Books  Magazines

You must search for “Google Books Advanced Search” to access it!

## Using PubMed to determine keywords

## Lessons Learned

- Publicly accessible databases and search engines can be incredibly useful
- Never rely on only one resource. Using multiple resources is essential to quality results
- Using search operators can dramatically improve your search results
- Spend time to learn about the advanced features and techniques for each resource
- Work to find the specific terminology used in the scientific literature. Using PubMed search box prompts can be useful.

## Free to subscribe

### FLSB Library email list

Jeff.Teitelbaum@wsp.wa.gov

W1: Information Does Exist Beyond the First Page of Your Google® Search!  
 American Academy of Forensic Sciences  
 Las Vegas, NV (February 22, 2016)

**Case Examples 2**

**Susan Makar**  
 NIST Information Services Office

**Case Examples:  
 Identifying Expert Witnesses**

I need to identify an expert witness in fiber identification for an upcoming murder trial. Who are some possible candidates?

I was given Rob Ogden as a forensics wildlife expert. How can I verify his expertise and ensure that he can be used as an expert witness in a criminal case involving wildlife poaching?

**Web of Science – Begin Search**

- Determine key concepts – forensic AND fibers
- Truncate words to pick up variations, i.e., forensic, forensics
- Identify synonyms and combine using the "OR" connector

**Web of Science – Analyze Results**

Click on "Analyze Results" in the upper right

**Web of Science – Analyze by Author**

Results Analysis  
 <<Back to previous page

582 records. TOPIC: (forensic\*) AND TOPIC: (fiber\* or fibre\*)

Rank the records by this field: **Author** | Set display options: Show the top 10 Results | Minimum record count (threshold): 2 | Record count | Selected field

Analyze

- Select "Authors" from the list of fields by which papers can be ranked
- Choose display options to limit the top results (top 10, top 50, etc.)
- Click "Analyze" to view the authors with the most publications on forensics and fibers

**Web of Science – Select Author**

Results Analysis  
 <<Back to previous page

582 records. TOPIC: (forensic\*) AND TOPIC: (fiber\* or fibre\*)

Rank the records by this field: **Author** | Set display options: Show the top 10 Results | Minimum record count (threshold): 2 | Record count | Selected field

Analyze

Use the checkboxes below to view the records. You can choose to view those selected records, or you can exclude them (and view the others).

Field: Authors	Record Count	% of 582	Bar Chart
<input type="checkbox"/> GRIEVE MC	20	3.436 %	
<input type="checkbox"/> ROUX C	16	2.749 %	
<input type="checkbox"/> CAUSEN IV	12	2.062 %	
<input type="checkbox"/> DE WAEEL K	12	2.062 %	
<input type="checkbox"/> ROBERTSON J	10	1.718 %	
<input type="checkbox"/> MARIGO A	9	1.546 %	
<input type="checkbox"/> WAS-GUBALA J	9	1.546 %	
<input type="checkbox"/> MAREGA C	8	1.375 %	
<input type="checkbox"/> PALMER R	8	1.375 %	
<input type="checkbox"/> WIGGINS KG	8	1.375 %	

Select the author(s) with the most papers

### Web of Science – Scan Search Results

The screenshot shows a search results page with four entries. The first entry is highlighted with a red box around the title and author information. A red circle highlights the 'Times Cited: 7' for the first paper. Below the search results, there is a list of bullet points.

- Scan search results to ensure papers are on target
- Note the times cited for each paper
- Select a paper to learn more about the authors' affiliations

### Web of Science – Check Address Field

The screenshot shows the abstract page for the first paper. A red arrow points to the author's affiliation: 'Forens Sci Inst, D-68193 Wiesbaden, Germany'. Below this, a red circle highlights the address field. A red arrow points to the text 'Is this the address of a reputable organization?'.

Is this the address of a reputable organization?

### Case Examples: Identifying Expert Witnesses

I was given Rob Ogden as a forensics wildlife expert. How can I verify his expertise and ensure that he can be used as an expert witness in a criminal case involving poaching?

### Google Scholar

The screenshot shows the Google Scholar profile for Rob Ogden. A red circle highlights the 'Citation Indices' section, which shows an h-index of 22 and an i10-index of 33. Below the profile, there is a list of papers with their citation counts and years. A list of bullet points is provided at the bottom.

- Papers ranked by times cited (screen shot lists only 4 of 70 papers); scroll down the list to find current papers with fewer cites
- Citation data includes citation counts and h-index

### Web of Science – Begin Search

The screenshot shows the Web of Science search interface. The search terms 'ogden r\*' and 'wildlife forensic\*' are entered. The 'Search' button is highlighted. Below the search interface, there is a list of bullet points.

- Truncate author's name to pick up full name or first/middle initials
- Adding key concepts will limit search to the right R. Ogden

### Web of Science – Search Results

The screenshot shows search results for 'wildlife forensic science'. The first three results are highlighted in yellow. Red circles highlight the 'Times Cited' counts for the first three papers: 8, 19, and 19. Below the search results, there is a list of bullet points.

- Note yellow highlighted search terms in search results
- Note citation counts of individual papers
- Only eight papers, are there more?

### Web of Science – Begin Author Search

What if Ogden's papers do not include the words "wildlife" and "forensics"? An author search can demonstrate the breadth of his work and find additional papers.

Select Author Search from the drop-down box next to "Basic Search." This will begin the process of identifying the correct author.

### Web of Science – Enter Author Name

- Enter the full last name
- Abbreviate first name to pick up first and middle name variations, i.e., Robert, Rob, R, etc.
- Click on "Select Research Domain"

### Web of Science – Select Research Domain

- Check the appropriate box(es) to indicate the author's research domain
- Click on "Select Organization" if the author's organization is known
- Click on "Finish Search" if the author's organization is unknown

### Web of Science – Refine Results

- Several choices if organization is unknown:
- Use filters to exclude (or include) subject disciplines
- Scan 114 author record sets

### Web of Science – Scan Record Sets

- Even with over 100 record sets it is easy to scan for the correct author
- Look for many clues – correct initials, research areas, publication years
- View sampling of author's publications if still unsure

### Questions?

Contact:

Susan Makar  
[susan.makar@nist.gov](mailto:susan.makar@nist.gov)


**W1: Information Does Exist Beyond the First Page of Your Google® Search!**  
 American Academy of Forensic Sciences  
 Las Vegas, NV (February 22, 2016)
 

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**ForSciPub:**  
**A Vision for the Future of Forensic Science Literature**

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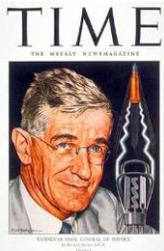
**Melissa Taylor**  
 Forensic Science Research Manager, Special Programs Office  
 National Institute of Standards and Technology






Why do I care about this topic?

- NIJ
  - Technical Writer
  - General Forensic Program Manager
- Standardization II Committee Member
- SoFS Member
- Research Manager at NIST


**“Science... has provided a record of ideas and has enabled man to manipulate and to make extracts from that record so that knowledge evolves and endures throughout the life of a race rather than that of an individual.”**  
 - Vannevar Bush

Information is everywhere!



Forensic Science Information



Knowledge & Practice

- Journal articles
- Gap Analysis
- Data
- Trends
- Scientific Presentations
- New Research Questions
- Newsletters/Circulars
- New Methods
- Conference Proceedings
- Research Reports
- Standards and Best Practices
- Miscellaneous


**FORS** Forensic Bibliographic Database  
*Compiled by scientists for scientists*

**LOST with FSS closure in 2012**

- FORS® is a bibliographic database which contains almost 100,000 records featuring abstracts of scientific papers, conference proceedings, books, technical reports and government publications.
- FORS was started in 1969 by the UK Home Office Central Research Establishment.
- The FORS® database is multidisciplinary and covers literature relevant to the examination of evidential materials, analytical methods and the presentation of findings.
- The database routinely scans a core list of about 150 journals published worldwide, together with any references obtained to assist in Forensic casework are included in the database.

Explore the world of forensics ... *all from one site.*


**ARCHIVE.** Keep a central archive of research publications and standards related to the forensic sciences, preserving vital forensic science research results and information for years to come.

**PROVIDE ACCESS.** Provide electronic access to this comprehensive compendium of literature related to the forensic sciences for to better inform forensic scientists, students, legal professionals, law enforcement, academics, and the general public.

**ADVANCE SCIENCE.** Create an information resource for scientists and technology developers to help advance knowledge and improve forensic science practice.

**The ability to consult works of reference is the foundation of scholarship**



## Finding Hidden Gems

### 23 Fingertip Model for Blood Flow and Temperature

*Ying He, Hongwei Shao, Yuanliang Tang, Irina Mizeva, and Hengdi Zhang*

## Progress to date

- Collected more than 7,000 citations related to fingerprint analysis
  - Journal articles, guidance and advice, circulars, reports, conference proceedings, research reports, standards, and codes of practice from worldwide sources
- Developed robust taxonomy for fingerprint-related sources which consists of:
  - 325 standard vocabulary keywords
  - 182 synonyms
- Established Taxonomy Working Group of forensic subject-matter experts, web developers, and forensic students to review and contribute to the draft taxonomy
- Developed automatic tagging of citations with standard vocabulary keywords
- Created a module for SMEs to approve content and tag new keywords

## Was it worth it?

*Comparing ForSciPubs collection of fingerprint articles to PMC, NCJRS, and ScienceDirect*

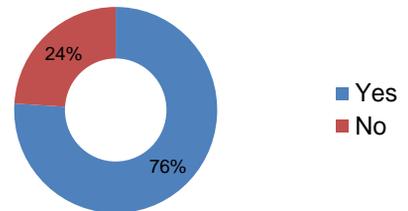
ForSciPubs collection included more relevant journals



## Was it worth it?

*Comparing ForSciPubs to Google Scholar*

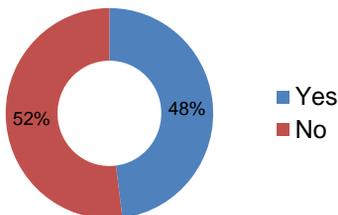
Found when searched for title in quotes



## Was it worth it?

*Comparing ForSciPubs to Google Scholar*

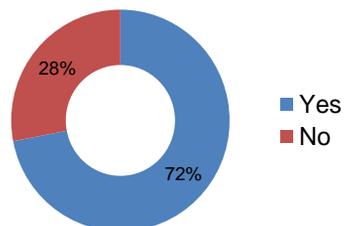
Found when searched for author(s) name

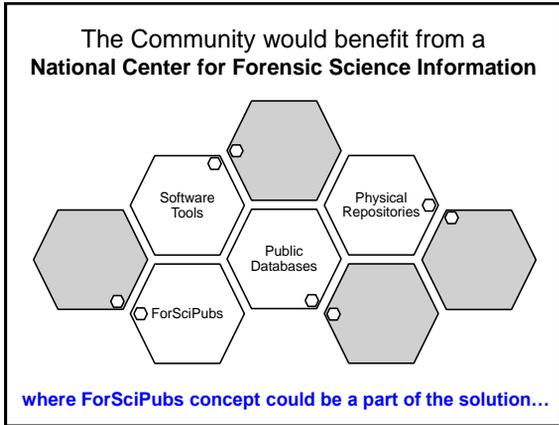


## Was it worth it?

*Comparing ForSciPubs to Google Scholar*

Found when searched for author(s) name and title





### My Overall Summary Thoughts

**ARCHIVE.** Keep a central archive of research publications and standards related to the forensic sciences, preserving vital forensic science research results and information for years to come.

**PROVIDE ACCESS.** Provide electronic access to this comprehensive compendium of literature related to the forensic sciences for to better inform forensic scientists, students, legal professionals, law enforcement, academics, and the general public.

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**The ability to consult works of reference is the foundation of scholarship**

**Thank you for your attention!**

- Acknowledgments:
  - Funding from NIST Special Programs Office Forensic Science Program

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**A copy of this presentation will be made available at:**  
<http://www.cstl.nist.gov/strbase/NISTpub.htm>

W1: Information Does Exist Beyond the First Page of Your Google® Search!  
 American Academy of Forensic Sciences  
 Las Vegas, NV (February 22, 2016)

**Other Activities Regarding Forensic Literature: AAAS, NCFS, OSAC**

**John M. Butler**  
 NIST Fellow & Special Assistant to the Director for Forensic Science  
 National Institute of Standards and Technology

FORENSIC SCIENCES | NIST National Institute of Standards and Technology U.S. Department of Commerce | ISO

**Topics to Cover**

- Review Articles & Literature Listings:
  - Analytical Chemistry Application Review Articles by Tom Brettell and colleagues (1983-2011)
  - Interpol Literature Reviews (only 2013 is online)
  - SWG Bibliographies Provided to SoFS
- NCFS Views Document on Scientific Literature
- AAAS Forensic Science Literature Evaluation
- OSAC Activities in Literature/Research

**Application Reviews on Forensic Science**  
 appeared every other year in June 15 issue of *Analytical Chemistry* from 1983 to 2011

These reviews are **methods-focused with brief descriptions provided of hundreds of forensic science publications from the two previous years**. No attempt is made to prioritize the publications listed or to assess the quality of the work.

**Forensic Science**  
 T. A. Brettell\*  
 Office of Forensic Science, 1200 Negron Road, Box 1334, Mount Airy, NC 27551-1334  
 J. M. Butler  
 National Institute of Standards and Technology, Gaithersburg, MD 20899-8112  
 R. Safenstein  
 Department of Chemistry, University of North Carolina at Charlotte, Charlotte, NC 28223  
 J. R. Almirall  
 Department of Chemistry and Biochemistry and International Forensic Research Institute, Florida International University, University Park, Miami, Florida 33199, United States

**Application Reviews on Forensic Science published in the journal *Analytical Chemistry***

- 15 review articles by Tom Brettell, Rich Safenstein, and other co-authors
- Provides a brief description of 9263 articles spanning 30 years of publications

Year Published	Years Covered	# Articles Reviewed	# DNA Articles Reviewed	% DNA
1983	1981 & 1982	490	0	0.0%
1985	1983 & 1984	536	0	0.0%
1987	1985 & 1986	496	6	1.2%
1989	1987 & 1988	602	18	3.0%
1991	1989 & 1990	691	48	6.9%
1993	1991 & 1992	824	102	12.4%
1995	1993 & 1994	843	146	17.3%
1997	1995 & 1996	811	152	18.7%
1999	1997 & 1998	782	138	17.6%
2001	1999 & 2000	243	91	37.4%
2003	2001 & 2002	469	148	31.6%
2005	2003 & 2004	789	250	31.7%
2007	2005 & 2006	560	181	32.3%
2009	2007 & 2008	552	163	29.5%
2011	2009 & 2010	575	122	21.2%
<b>TOTAL</b>		<b>9263</b>	<b>1565</b>	<b>16.9%</b>

**Focus areas:**  
 (1) drugs & poisons,  
 (2) forensic DNA & biochemistry, and  
 (3) trace evidence

Table 4 in J.M. Butler (2015) U.S. initiatives to strengthen forensic science & international standards in forensic DNA. *Forensic Sci. Int. Genet.* 18: 4-20

**Interpol Literature Summaries**

928 page pdf file available for download

17th Interpol International Forensic Science Managers Symposium, Lyon

8<sup>th</sup> - 10<sup>th</sup> October 2013

Review Papers

Edited by Prof. Niamh Nic Daeid  
 Centre for Forensic Science, University of Strathclyde, Glasgow, UK

- Interpol holds a forensic science symposium **every three years** that involves a review of literature in multiple forensic disciplines
- With the last cycle of reviews in 2013, 18 topics are reviewed by **authors from countries around the world** that cover a total of 4968 reference citations
- A 928 page pdf file is available at <http://www.interpol.int/content/download/21910/%20206602/version/1/file/IFSMSReviewPapers2013.pdf>

**A summary of information reviewed as part of the most recent Interpol tri-annual International Forensic Science Managers Symposium covering literature and activities from 2010 to 2013**

Firearms	Erwin J.A.T. Matthee (Netherlands Forensic Institute)	159
Gun Shot Residue	Sébastien Charlet and Bart Nys (NCC-NICC Brussels, Belgium)	49
Toolmarks	Nadine Levin (Israel National Police)	189
Paint	Laurie Heick, Marc Linnay, Gilbert De Roy, Laurent Kohler (NCC-NICC Brussels, Belgium)	201
Fibers and Textiles	Ray Palmer (Northumbria University, UK)	85
Forensic Geology	Ritsuko Sugita, Hiroshi Yamagi, Hirofumi Fukushima (National Research Institute of Police Science, Japan)	221 cited but only 102 references listed
Arson & Fire Debris Analysis	Nina Vitala and Mika Hyypää (National Bureau of Investigation, Finland)	157 cited but only 140 references listed
Explosives & Explosive Residues	Douglas J. Klapes and Greg Czarnopis (Bureau of Alcohol, Tobacco, Firearms and Explosives, USA)	1341
Drug Evidence	Jeffrey H. Compton and Robert F.X. Klein (Drug Enforcement Administration, USA)	668
Toxicology	Wai-ming Tam, Lai-chu Chiu, Wing-sun Chan, Tai-wa Wong, Koi-ma Fung, Wing-cheung Wong, Wai-ki Lee, Wing-ssai Lee, Kwan-man Fung (Hong Kong Government Laboratory)	324
Forensic Audio Analysis	Caetan Gregoras, Jeff M. Smith, Geoffrey Stewart Morrison, Ewald Bruggler (University of Colorado-Denver, USA and University of New South Wales, Australia)	133
Forensic Video Analysis	Matthew E. Graves (United States Army Criminal Investigation Laboratory)	31
Imaging	Arnout Ruitink, Zeno Gerards, Jermen Biphold (Netherlands Forensic Institute)	256
Digital Evidence	Paul Reedy and Jaime Buzazo (Department of Forensic Science, District of Columbia and A.S. Solutions at NSA Headquarters, USA)	190
Fingermarks and Other Impressions	Nicole Egli, Sébastien Moret, Andy Blake, Christophe Champod (University of Lucerne, Switzerland)	472
Body Fluid Identification and DNA Typing in Forensic Biology	Christine Jolicoeur (Ministry of Public Security, Quebec, Canada)	114
Questioned Documents	Franck Planchou (RCGN, Remy Sous Bois, France)	275
Forensic Science Management	Mix M. Houk, Melissa Porter, Brown Davies (Department of Forensic Sciences and George Washington University, Washington, DC, USA)	120

Table 5 in J.M. Butler (2015) U.S. initiatives to strengthen forensic science & international standards in forensic DNA. *Forensic Sci. Int. Genet.* 18: 4-20

## SWG Annotated Bibliographies

- During its operation from 2009-2012, the White House **Subcommittee on Forensic Science (SoFS) requested annotated bibliographies** from the then appropriate Scientific Working Groups (SWGs) or other professional organizations
- Responses from **10 forensic disciplines** were submitted to address specific questions raised by SoFS
- SoFS was disbanded before these bibliographies were reviewed or analyzed – **AAAS plans to do this function**
- The original bibliographies are available at <http://www.nist.gov/forensics/workgroups.cfm#B>

## SWG Foundational Forensic Annotated Bibliographies

originally provided to the White House Subcommittee on Forensic Science (SoFS) by Scientific Working Groups (SWGs)

Files available at <http://www.nist.gov/forensics/workgroups.cfm#B>

Forensic Discipline	# Articles or Information Provided	Submitter	Received by SoFS
Firearms & Toolmarks	24 primary references (84 pages of material covering 25 questions)	Association of Firearm and Tool Mark Examiners (AFTE) and SWGGUN	June 14, 2011
Bloodstain Pattern Analysis	39 pages 19 questions	SWGSTAIN	Sept 29, 2011
Bitemark Analysis	62 pages 18 questions	American Board of Forensic Odontology (ABFO)	Oct 2, 2011
Fiber Analysis	32 pages 18 questions	SWGEMAT	Oct 18, 2011
Shoeprint & Tire Tread	38 pages 14 questions	SWGTFREAD	Nov 16, 2011
Latent Print Analysis	63 pages	SWGFAST	Nov 17, 2011
Arson Investigation & Burn Pattern Analysis	32 pages 16 questions	T/SWGFEX	Dec 12, 2011
Digital Evidence	11 pages 18 questions	SWGDE	Jan 17, 2012
Hair Analysis	21 pages 20 questions	SWGEMAT	Sept 21, 2012
Paint & Other Coatings	29 pages 19 questions	SWGEMAT	Sept 21, 2012

Table 6 in J.M. Butler (2015) U.S. initiatives to strengthen forensic science & international standards in forensic DNA. *Forensic Sci. Int. Genet.* 18: 4-20

## National Commission on Forensic Science (NCFS) Activities Regarding Forensic Literature

- **NCFS Scientific Inquiry & Research Subcommittee has been discussing issues with the forensic science literature**

"A cursory review of the literature citations raised concerns within the NCFS that extend beyond these specific [SWG] bibliographies [provided to the SoFS]:

"1. In some cases, it was unclear which literature citations are crucial to support the foundation of a particular forensic science discipline.

"2. Some of the cited literature had not undergone a rigorous peer-review process."

From Jan. 2015 NCFS work product: "Scientific Literature in Support of Forensic Science and Practice"



## NATIONAL COMMISSION ON FORENSIC SCIENCE

**NIST**  
National Institute of Standards and Technology  
U.S. Department of Commerce

### Scientific Literature in Support of Forensic Science and Practice

#### Commission Action:

On January 30, 2015, the Commission voted unanimously to adopt this work product.

#### Type of Work Product:

Views Document issued by the Scientific Inquiry and Research Subcommittee

- "The NCFS believes that **a comprehensive evaluation of the scientific literature is critical** for the advancement of forensic science policy and practice in the United States."

From Jan. 2015 NCFS work product: "Scientific Literature in Support of Forensic Science and Practice"

It is the position of the NCFS that **foundational, scientific literature supportive of forensic practice should meet criteria** such as the following:

- **Peer-reviewed** in the form of original research, substantive reviews of the original research, clinical trial reports, or reports of consensus development conferences
- **Published in a journal or book** that has an **International Standard Number** (ISSN for journals; ISBN for books) and **recognized expert(s) as authors** (for books) or on its Editorial Board (for journals)
- Published in a journal that maintains a clear and publicly available statement of purpose that **encourages ethical conduct such as disclosure of potential conflicts of interest** integral to the peer review process
- Published in a journal that **utilizes rigorous peer review with independent external reviewers** to validate the accuracy in its publications and their overall consistency with scientific norms of practice
- Published in a journal that is **searchable using free, publicly available search engines** (e.g. PubMed, Google Scholar, National Criminal Justice Reference Service) that search major databases of scientific literature (e.g. Medline, National Criminal Justice Reference Service Abstracts Database, and Xplore)
- Published in a journal that is **indexed in databases that are available through academic libraries and other services** (e.g. JSTOR, Web of Science, Academic Search Complete, and SciFinder Scholar)

From Jan. 2015 NCFS work product: "Scientific Literature in Support of Forensic Science and Practice"

## AAAS Forensic Science Assessments



The American Association for the Advancement of Science  
<http://www.aaas.org>

- With funding from the **Laura and John Arnold Foundation**, AAAS plans to conduct an analysis of the underlying scientific bases for the forensic tools and methods currently used in the criminal justice system
- This project will **evaluate the quality of the studies the forensic community relies on to support its practices** and, where the scientific underpinning of these practices falls short, recommend a research agenda for the field

<http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis>

### The Laura and John Arnold Foundation

<http://www.arnoldfoundation.org/initiative/criminal-justice/forensic-science/>

### AAAS Update Provided to NCFS in Dec 2015

**AAAS Project Staff**  
**Mark S. Frankel**, Project Director  
**Deborah Runkle**, Project Manager  
**Michelle Barretta**, Project Assistant

**AAAS Project Staff**  
 Mark S. Frankel, Deborah Runkle, Michelle Barretta  
 Scientific Responsibility, Human Rights and Law Program  
 American Association for the Advancement of Science

The AAAS Project is supported by a grant from the Laura and John Arnold Foundation

<http://www.aaas.org/sites/default/files/AAAS%20NCFS%20Presentation%20Dec%202015%20MSF%20REV%20MB%2012-4-15.pdf>

### Forensic Disciplines Planned for Evaluation by AAAS

1. **Latent Fingerprints** -- [Working Group \(WG\) members](#)  
(meeting date: July 09, 2015)
2. **Fire Investigation** -- [WG members](#)  
(meeting date: July 20, 2015)
3. **Firearms and Toolmarks/Ballistics** -- [WG members](#)  
(meeting date: August 20, 2015)
4. Bloodstain Pattern Analysis
5. Digital Evidence
6. Footwear and Tire Tracks
7. Forensic Odontology- Bitemark Analysis
8. Trace Evidence- Fibers
9. Trace Evidence- Hair
10. Trace Evidence- Paint & Other coatings

<http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis>

### Advisory Committee to AAAS Assessment

- **Martha Bashford**, JD  
Chief, Sex Crimes Unit  
New York County District Attorney
- **Shari Seidman Diamond**, JD, PhD  
Professor of Law and Psychology  
Northwestern University School of Law  
Research Professor, American Bar Foundation
- **Gilbert S. Omenn**, MD, PhD  
Director, Center for Computational Medicine and Bioinformatics  
University of Michigan
- **Hal Stern**, PhD  
Professor of Statistics  
University of California, Irvine

- **Jeff Salyards**, PhD, MFS  
Director, Defense Forensic Science Center  
Defense Forensics & Biometrics Agency
- **Barbara Hervey**, JD  
Judge, Texas Court of Criminal Appeals
- **Jules Epstein**, JD  
Professor of Law  
Temple University School of Law
- **Itiel Dror**, PhD  
University College of London & Cognitive Consultants International Ltd.

**NCFS Commissioners or Subcommittee Members**

<http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis>

### Latent Fingerprint Analysis Working Group

- **William Thompson**, J.D., Ph.D. (Chair)  
– (Human Factors) University of California, Irvine
- **Anil Jain**, Ph.D.  
– (Biometric Engineering) Michigan State University
- **Jay Kadane**, Ph.D.  
– (Statistics) Carnegie Mellon University
- **John Black**  
– (Forensic Science) Black & White Forensics, LLC.

<http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis>

### Fire Investigations Working Group

- **Jose Almirall**, Ph.D. (Chair)  
– (Chemistry) Florida International University
- **Hal Arkes**, Ph.D.  
– (Cognitive Psychology/Human Factors) Ohio State University
- **Frederick Mowrer**, Ph.D.  
– (Fire Protection Engineering/Fire Science) Cal Poly State University
- **Janusz Pawliszyn**, Ph.D.  
– (Analytical Chemistry) University of Waterloo
- **John Lentini**, CFI, D-ABC  
– (Forensic Science) Scientific Fire Analysis, LLC.

<http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis>

### Firearms and Tool Marks Working Group

- **Tom Busey**, Ph.D. (Chair)
  - (Cognitive Psychology/Human Factors) Indiana University
- **Bruce Craig**, Ph.D.
  - (Statistics) Purdue University
- **Chittaranj Sahay**, Ph.D.
  - (Manufacturing Engineering/Metrology) University of Hartford
- **Christopher Schuh**, Ph.D.
  - (Materials Engineering) MIT
- **Robert Thompson**
  - (Forensic Science) NIST

http://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis

### AAAS Reports to Be Issued Soon...

Slide from AAAS presentation to NCFCS on December 8, 2015

Forensic Science Assessments: A Quality and Gap Analysis



#### Sample Table of Contents

- Cover
- Disclaimer
- Acknowledgments
- Table of Contents
  - Introduction
  - Methods at a Glance
  - Fire Investigation- A Primer
  - Conclusions and Recommendations
    - A. Fire Scene Investigation
    - B. Fire Debris Analysis
  - References
- Appendices
  - Working Group Roster
  - Working Group Bios
  - Methods in Detail
  - Bibliography
  - Working Group Questions that framed the Report
  - Project Advisory Committee and Staff

First reports expected in early 2016

http://www.aaas.org/sites/default/files/AAAS%20NCFCS%20Presentation%20Dec%202015%20MSF%20Rev%20MB%2012-4-15.pdf

### Recent NSF/NIJ-Funded Workshop



- Meeting was held at the AAAS headquarters (Washington, DC) on May 26-27, 2015; **proceedings are forthcoming**
- Some relevant articles:
  - "Impact of forensic literature on the admissibility process" (Michael T. Ambrosino)
  - "Policy implications of inadequate literature" (Ronald N. Kostoff)
  - "A quality and gap analysis: an AAAS forensic science literature project" (Deborah Runkle)
  - "How do we trust the scientific literature?" (Simon A. Cole)

Forensic Science Research Evaluation  
Edward G. Bartick and McKenzie Floyd, Eds.

### Organization of Scientific Area Committees (OSAC) Activities

- OSAC is focused on aiding development of standards and best practices for the forensic science community and **is not currently planning on performing evaluation of scientific literature**
- However, practitioner feedback that arises during research gap analysis as part of the OSAC standards development activities will be documented, consolidated, and shared with the broader community. This research list will encompass inputs from the all of the 24 subcommittees and five Scientific Area Committees (SACs).
- For more information, see <http://www.nist.gov/forensics/osac/osac-research-needs-assessments.cfm>

### Thank you for your attention!

- Acknowledgments:
  - Funding from NIST Special Programs Office Forensic Science Program

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